

REMARKS

We incorporate herein the substance of the Interview conducted June 25, 2004.

In the present Amendment, Claim 1 has been amended to replace “40 μm or less” with --0.1 to 40 μm --. This amendment is supported by the specification, for example, page 15, lines 1-4, original Claim 1 and the working examples.

Claim 1 has also been amended to recite that --the metal oxide is a metal oxide of a metal element selected from the group consisting of the metal elements of the Group IB, IIA, IIB, IIIA, IIIB, IVB, VA, VB, VIB, VIIB and VIIIB of the Periodic Table--. This amendment is supported by the specification, for example, in the last paragraph on page 9 and in original Claim 5.

Specifically, the specification describes that “Examples of the metal element contained in the raw material metal oxide powder are the metal elements of the Group Ib of the Periodic Table such as copper, etc.; the metal elements of the Group II such as magnesium, zinc, etc.; the metal elements of the Group III such as yttrium, cerium, gallium, indium, uranium, etc.; the metal elements of the Group IV such as titanium, zirconium, germanium, etc.; the metal elements of the Group V such as vanadium, niobium, tantalum, bismuth, etc.; the metal elements of the Group VI such as chromium; the metal elements of the Group VII such as manganese; and the metal elements of the Group VIII such as iron, cobalt, nickel, etc.” (page 9).

From the above description, it is clear that in the present specification, Groups II, III, IV and V represent Groups IIA and IIB, IIIA and IIIB, IVA and IVB, and VA and VB, respectively; whereas Groups VI, VII and VIII represent Groups VIB, VIIB and VIIIB, respectively.

Claim 27 has been amended to replace “Groups Ib, II, III, IV, V, VI, VII and VIII of the Periodic Table” with --Groups IB, IIA, IIB, IIIA, IIIB, IVA, IVB, VA, VB, VIB, VIIB and VIIIB

of the Periodic Table--. This amendment is supported by the specification, for example, in the last paragraph on page 9, as set forth above.

Claims 6-10 have been amended to correct a grammatical error. These amendments are not to be deemed to narrow the scope of Claims 6-10.

Claims 9 and 10 have been amended to delete the element “tin” and “germanium,” respectively.

Claim 5 has been canceled.

No new matter has been added and entry of the Amendment is respectfully requested. Upon entry of the Amendment, Claims 1, 4, 6-28, 31 and 32 will be all the claims pending in the application.

At page 2 of the Office Action dated March 2, 2004, Claim 1 has been rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the enablement requirement.

At page 2 of the Office Action, Claim 1 has been rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement.

Applicants respectfully submit that amended Claim 1 is in full compliance with the 112, first paragraph requirements. As described above, Applicants have in the present Amendment, amended Claim 1 to replace “40 μm or less” with --0.1 to 40 μm --. The specification describes on page 15, lines 3-4, that “In general, it is possible to obtain the metal oxide powder having the particle size of 0.1 to 300 μm .” Further, all of the working examples in Tables 1-4 of the specification show a number average particle size of 40 μm or less. Specifically, the following metal oxides were produced in Examples:

- 1) TiO₂ having a number average particle size of 2 to 9 μm

- (Ex. Nos. 1-10 in Table 1);
- 2) TiO_2 having a number average particle size of 0.9 to 13 μm
(Ex. Nos. 11-19 in Table 2);
- 3) ZrO_2 having a number average particle size of 10 to 40 μm
(Ex. Nos. 20-22 in Table 3);
- 4) MgO having a number average particle size of 4 to 30 μm
(Ex. Nos. 23-25 in Table 3);
- 5) Fe_2O_3 having a number average particle size of 5 μm
(Ex. No. 26 in Table 4);
- 6) CeO_2 having a number average particle size of 1.5 μm
(Ex. No. 27 in Table 4);
- 7) SnO_2 having a number average particle size of 0.4 μm
(Ex. No. 28 in Table 4);
- 8) In_2O_3 having a number average particle size of 0.2 μm
(Ex. No. 29 in Table 4).

Therefore, Applicants respectfully submit that one of ordinary skill in the art would be able to make and use the present invention in light of the disclosure and that the recitation is fully supported by the specification. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejections.

During the Interview of June 25, 2004, Applicants discussed these issues with the Examiner.

At page 3 of the Office Action, Claims 1, 4-6, 11-13, 20, 23, 24 and 26-28 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Jodden '163.

Applicants respectfully submit that the amended claims are patentable over Jodden '163 for at least the following reasons.

Jodden '163 discloses a process for making titanium dioxide concentrates. However, the titanium dioxide particles prepared by the process of Jodden '163 are not polyhedral particles having a number average particle size of 0.1 to 40 μm , as recited in present Claim 1.

Applicants attach herewith a copy of the Mr. Umeda's Declaration under 37 C.F.R. § 1.132 (original Declaration was previously submitted August 2, 2004). The declaration demonstrates that the titanium oxide of Jodden '163 is different from the metal oxide in the present invention.

In the Declaration, in Experiment 1, a titanium oxide concentrate was prepared by using the method described in Example 3 of Jodden '163. The SEM photographs and the XRD patterns of the raw material and the obtained powder were obtained (Figures 1-4). As shown in Fig. 3, the titanium oxide thus obtained did not contain polyhedral particles with at least 6 planes each, and a number average particles size of 0.1 to 40 μm . Similarly, in Experiment 2, the titanium oxide obtained did not contain polyhedral particles with at least 6 planes each.

In conclusion, Mr. Umeda states that the titanium oxide obtained by the process of Jodden '163 is different from the metal oxide as claimed in the present invention.

In view of the above, Applicants respectfully submit that the present invention is not obvious over Jodden '163 and the rejection should be withdrawn.

At page 4 of the Office Action, Claims 1, 4-8, 11-13, 20, 23, 24, 26-28 and 31 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Pastor '656.

Applicants respectfully submit that the amended claims are patentable over Pastor '656 for at least the following reasons.

Pastor '656 discloses a process for the preparation of a water-free oxide of silicon or germanium, both of which are Group IVA elements, which are not included in present Claim 1, comprising the steps of:

(a) reacting a nonpolar chloride compound containing said silicon or germanium with dimethylsulfoxide to form a precipitate containing said oxide, in a nonaqueous aprotic liquid solvent...;

(b) separating said precipitate formed in step "a" from said solvent under water-free conditions; and

(c) exposing said precipitate to a gas phase reactive atmosphere comprising atomic halogen....

In the process of Pastor, water in the oxide of silicon or germanium is reacted with atomic halogen to be removed from the oxide. Thereby, the water-free oxide is obtained. The resulting water-free metal oxide is used as an optical material since it transmits radiation in the near infrared wavelength region (see column 1, lines 10-16).

Furthermore, Pastor discloses only a process for removing water from the oxide to make the water-free oxide, but does not disclose or suggest any process for producing a metal oxide of a metal element selected from the group consisting of the metal elements of the Groups IB, IIA, IIB, IIIA, IIIB, IVA, IVB, VA, VB, VIB, VIIIB and VIIIB of the Periodic Table (relevant to

present Claims 13, 20, 23, 24, 26-28 and 31), or a metal oxide of a metal element selected from the group consisting of the metal elements of the Groups IB, IIA, IIB, IIIA, IIIB, IVB, VA, VB, VIB, VIIIB and VIIIB of the Periodic Table and having the controlled particle shape and specific number average particle size (relevant to present Claims 1, 4-8, 11 and 12).

In view of the above, Applicants respectfully submit that the present invention is not obvious over Pastor and the rejection should be withdrawn.

At page 4 of the Office Action, Claims 1, 4-10, 13, 15, 16, 18-20, 22-24, 26-28, 31 and 32 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Brackelsberg '258.

Applicants respectfully submit that the amended claims are patentable over Brackelsberg '258 for at least the following reasons.

Brackelsberg discloses a process of manufacturing pure iron or manganese metal from pure or impure iron or manganese-metal oxides. In the process of Brackelsberg, pure iron or pure manganese, that is, a metal is obtained from a metal oxide.

In contrast, the present invention provides a metal oxide, but not a pure metal.

In view of the above, Applicants respectfully submit that the present invention is not obvious over Brackelsberg and the rejection should be withdrawn.

At page 6 of the Office Action, Claims 1, 4-28, 31 and 32 have been rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over Claims 1-11 of U.S. Patent No. 6,303,091; Claims 1-23 of U.S. Patent No. 5,688,480; and Claims 1-6 of U.S. Patent No. 5,840,267, individually. Further, at page 6 of the Office Action, Claims 1, 4-10, 13-28, 31 and 32 have been rejected under the judicially created doctrine of

obviousness-type double patenting as allegedly being unpatentable over Claims 1-6 of U.S. Patent No. 5,736,111. Last, at page 7 of the Office Action, Claims 1, 4-10, 13-28, 31 and 32 have been rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over Claims 1-7 of U.S. Patent No. 5,846,505.

Applicants attach herewith a copy of the Terminal Disclaimer (original copy was submitted August 2, 2004). Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejections.

In the Advisory Action dated August 18, 2004, the Examiner stated that the change to Claim 1 in the Amendment of August 2, 2004 excludes Group IV elements, however, instant Claims 6 and 7, which depend on claim 1, each recites a group IV element (Ti or Zr).

Applicants wish to point out that in the present Amendment, Claim 1 has been amended to exclude only Group IVA elements. Claims 6 and 7 recite Group IVB elements Ti and Zr which are included in Claim 1 and thus are in proper dependent form.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. §1.114 (c)
U.S. Application No.: 09/891,655

Attorney Docket Q51805

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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WASHINGTON OFFICE

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CUSTOMER NUMBER

Date: September 1, 2004



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Masahide Mohri, et al

Serial No.: 09/891,655

Group Art Unit: 1754

Filed: June 27, 2001

Examiner: Steven J. Bos

For: METAL OXIDE POWDER AND METHOD FOR THE
PRODUCTION OF THE SAME

DECLARATION OF TETSU UMEDA UNDER 37 C.F.R §1.132

Honorable Commissioner of Patents and Trademarks

Washington, D.C. 20231

Sir:

I, Tetsu Umeda, a Japanese citizen residing at 2-13-1, Umezono,
Tsukuba-shi, Ibaraki, Japan, declare:

That I received a Master Degree from the Graduate School of Kyoto University, Department of Molecular Engineering in March 1990, and entered Sumitomo Chemical Company Limited in April, 1990, in which company I have since then been engaged in research for technology of inorganic material;

That I am familiar with the prosecution history of the above-identified application;

That the following experiment was conducted by me or under my direction.

Object of the Experiment

The object of the present experiment is to show that titanium oxide obtained by a process for making titanium oxide concentrates disclosed in USP 4,517,163 is different from the metal oxide as claimed in the present application.

Experimental 1.

The same method as described in Example 3 in USP 4,517,163 was carried out as follows:

Thirty grams of ilmenite consisting of particles with a size of 50-600 μm (average particle diameter of 280 μm) and composed of 52.9% of TiO_2 , 31.7% of iron (Fe) and 0.5% of vanadium (V) was charged into a platinum crucible and then the crucible was placed in an electric furnace with a quartz tube having an inner diameter of 54 mm. The ilmenite particles were calcined under nitrogen gas for one hour at 1000°C. After cooling, the calcined ilmenite particles were heated up to 1000°C while passing chlorine gas through the quartz tube at a flow rate of 30 liter/hr. Gaseous iron(III) chloride evolved. After a reaction period of 3 hours, 16.4 g of yellow flowable powder was obtained. The obtained powder had the peaks of TiO_2 and the weak peaks of Fe_2TiO_5 in a XRD pattern and composed of 85.4% of TiO_2 , 9.3% of iron (Fe) and 0.7% of vanadium (V). The composition of the powder was determined by X-ray fluorescence spectroscopy. The SEM photographs and the XRD patterns of the raw material ilmenite and the obtained powder are shown in Figs. 1 to 4, respectively.

According to Fig. 3, it was found that titanium oxide thus obtained did not contain polyhedral particles with at least 6 planes each, and a number average particle size of 40 μm or less.

Experimental 2.

Thirty grams of ilmenite consisting of particles with a size of 5-200 μm (average particle diameter of 63 μm) and composed of 55.8% of TiO_2 , 30.0% of iron (Fe) and 0.5% of vanadium(V) was charged into a platinum crucible and then the crucible was placed in an electric furnace with a

quartz tube having an inner diameter of 54mm. It was calcined under nitrogen gas for one hour at 1000°C. After cooling, the calcined ilmenite particles were heated up to 950°C while passing chlorine gas through the quartz tube at a flow rate of 50 liter/hr. Gaseous iron(III) chloride evolved. After a reaction period of 2 hours, 15.9 g of yellow flowable powder was obtained. The obtained powder had the peaks of TiO₂ in a XRD pattern and composed of 96.5% of TiO₂, 0.2% iron (Fe) and 0.8% of vanadium (V). The SEM photographs and the XRD patterns of the raw material ilmenite and the obtained powder are shown in Figs. 5 to 8, respectively.

According to Fig.7, it was found that titanium oxide thus obtained did not comprise polyhedral particles with at least 6 planes each.

Conclusion.

From the results reported above, it is apparent that the titanium oxide obtained by the process disclosed in USP 4,517,163 is different from the metal oxide as claimed in the present application.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above identified application or patent issued thereon.

Date: May 18, 2004

Tetsu Umeda
Tetsu Umeda